

FILM POSITIONING APPARATUS

This invention relates to an apparatus for properly positioning portions of a film being sealed to a container to form the cover thereof. In another aspect, this invention relates to an apparatus for positioning a printed portion of a film relative to a cover prior to sealing one to the other while automatically adjusting said film to compensate for minor film printing irregularities.

The prior art discloses methods for forming and sealing covers to containers, and means to maintain the necessary operational synchronization between the two lines being joined. All of these devices appear to be characterized by positive drive of the film from which the covers are formed, coupled with initial manual adjustment for the proper synchronization.

In the newer film packaging process of heat sealing covers cut from flexible film onto formed containers, it is important to maintain high handling speeds. A rate of container sealing as high as 60 per minute has been contemplated. At such rates, precutting or stamping of the cover sheet prior to sealing greatly complicates the sealing operation by requiring the handling of individual covers which are to be matched with the containers. Thus, it is desirable where employing flexible films as a cover sheet source to handle them as a continuous film sheet during positioning operations. A portion of the film is sealed to the package, and then cut to form an individual cover. The use of a flexible continuous cover film through the sealing steps introduces the problem of positioning the printed labels relative to the containers to be sealed. In a high speed sealing process, the continuous film is under tension and there will be, at times, a tendency toward film stretching. Also there will be inadvertent minor variations in the printing of the labels on the continuous film. The net effect on some of the closed containers is that the label is not centered and therefore not readily acceptable by appearance - conscious purchasers. Moreover, the prior art devices are simply not adapted to automatically compensating for these variations in synchronization.

It is therefore an object of this invention to provide an apparatus which automatically compensates for stretching of flexible film and for minor variations in the labels printed thereon to maintain proper positioning of the label cover on the container to be sealed. Another object of this invention is to provide an apparatus of the above-described type that is of more simple construction, requires reduced maintenance, supervision, and labor, and has fewer moving parts.

Other aspects, objects, and advantages of the present invention will become apparent from a study of the disclosure, the appended claims, and the drawing.

In the drawing:

FIG. 1 is a diagrammatic frontal view of the apparatus of this invention and the containers and sealing film; and

FIG. 2 is a diagram of the circuit and electrical controls of the invention.

Referring to FIG. 1, a plurality of containers 2 are placed in spaced apart relationship on a conveyor 4. The film reservoir 6 associated with a film indexing means (not shown) issues forth a continuous, flexible film 8 that is utilized for covering the containers 2. The film 8 can be formed of polyethylene, polypropylene, poly vinyl chloride, or the like and has spaced apart specific portions, such as printed labels, thereon. These specific film portions are carefully spaced apart during the manufacturing of this film 8 with each film portion and associated film sensing area 10 accurately positioned on the film relative to one another. Since these sensing areas 10 of the film 8 are utilized with this invention for positioning the specific film portion relative to the container 2 to be covered, and serves no other purpose on the container 2, it is recommended that the sensing areas 10 be positioned adjacent their associated film portion at a location at which subsequent trimming of the cover removes said areas 10 from the sealed carton 2. The construction of these sensing areas 10 is dependent upon the type of sensor 12 that is utilized in this invention to signal the relative position of the sensing area 10 and hence

a label or film portion relative to the sealing element 14. Examples of the various sensors 12 and corresponding sensing areas 10 that can be utilized are:

Type Sensor	Type Sensing Area on the Film
Proximity Switch	Magnetic
Sliding contact switch	Punched film
Photoelectric cell	Printed index mark

In order to simplify the construction of this apparatus it is preferred that this sensor to be a photoelectric cell and the film be manufactured with a printed index mark that will block or otherwise interrupt the light beam between the photoelectric cell and its source of light.

The film 8 extends from the film reservoir 6 into contact with a guide roller 16, adjacent and along the pathway of the containers 2 to be covered, and to the sealing element 14. The detecting means 18 of this invention is positioned adjacent the continuous film 8 moving toward the sealing element 14, the pathway of the sensing areas 10 on the moving film 8 and is laterally spaced along the pathway of the film 8 between the film reservoir 6 and the sealing element 14. It is preferred that the detecting means 18 be spaced a distance not greater than one printed label or film portion from the sealing element 14. Although the apparatus of this invention can function properly where the detecting means 18 is spaced a greater distance from the sealing element 14, if wider spacing is employed more complex delay means are recommended or specific control of positioning is reduced.

The detecting means 18 comprises a single sensor 12 that is actuated by a sensing area 10 of the film 8 to intermittently deliver a signal and is associated with the film indexing means. The intermittent signal delivered by the detecting means 18 is responsive to the location of a sensing area 10 and associated film portion relative to the sealing element 14. The delaying means 22 comprises a series of relays and is associated with the detecting means for delaying the signal until the film is sealed by the sealing element 14 and thereafter delivering the received signal to a controlling means 24 (said controls to be later described).

The sealing element 14 is positioned adjacent a container 2 on the conveyor 4 at a sealing station 26 at which location said container is brought to rest. The continuous film 8 at the sealing station 26 is positioned between the container 2 and the sealing element 14 and is reciprocally movable by a power source 28 relative thereto between a first position at which a tucker bar 30 and a heating head 32 of the sealing element 14 are spaced from the film 8 and a second position at which the heating head 32 is urging the film 8 into forcible contact with the container 2. At the second position the heating head 32 is energized to heat and seal the film 8 to the container 2.

The tucker bar 30 of this invention is a longitudinal bar having a blunt end for contacting the film 8 and an opposed end attached to the controlling means 24. The controlling means 24 comprises a driving means 36 attached to the tucker bar 30 and a power source such as an electric motor 38. The driving means 36 comprises a longitudinal shaft 40 having the tucker bar 30 mounted on one end thereof and a helical groove 42 formed on the opposed end. The helical groove 42 of the shaft 40 of the driving means 36 is operably connected to the electric motor 38. The controlling means 24 and associated tucker bar 30 are mounted on the sealing element 14 and are movable therewith between the first and second positions thereof. The tucker bar 30 is also longitudinally movable in response to activation of the controlling means 24 along a pathway preferably parallel to the pathway followed by the sealing element 14 moving between the first and second positions. The tucker bar 30 always extends a minimum distance below the bottom surface 15 of sealing element 14 so that the film 8 is tucked as the sealing element 14 reaches the limit of its movement at the second position.